

BOOK REVIEW

Plants for Medicines: a chemical and pharmacological survey of plants in the Australian region. D.J. Collins, C.C.J. Culvenor, J.A. Lamberton, J.W. Loder and J.R. Price. Published by CSIRO Publications, Melbourne. 1990. 303 pp. including 443 line illustrations and 64 colour plates. ISBN 0 643 04992 7 (Casebound). Price \$AU70.00.

In 1940, at the request of the Medical Equipment Control Committee of the Army and the National Health and Medical Research Council, an organised investigation of the Australian flora was initiated by the then Council for Scientific and Industrial Research on account of the war-time need to find local sources of several essential drugs of plant origin. An important stimulus to this investigation was the earlier successful production in Australia of hyoscyne for use in ophthalmology from indigenous Queensland *Duboisia* species. After the war the screening of the Australian flora for new compounds of commercial value became an important CSIRO project. The relative ease of obtaining interesting new chemical compounds from the unique flora, which was poorly known phytochemically, induced many chemists in Australian Universities to participate in the project. A collaborative effort by chemists from CSIRO and Australian Universities grew from this mutual interest and became known as the Australian Phytochemical Survey.

The phytochemical investigations most closely associated with the CSIRO screening programmes were those on alkaloids, tumour inhibitors and toxic constituents affecting livestock. Initially attention was focused on the rain-forest species of Queensland and northern New South Wales because early testing indicated that a higher proportion of alkaloid-containing species occurred in these areas. Special interest was attached to the investigation of alkaloid-positive species from plant families and genera which had not previously been found to contain alkaloid-yielding species as these were considered to be the most likely source of new and unusual types of alkaloids. Other criteria for selecting species with promising physiological activity were their use by Aborigines as medicines or poisons, and, on account of the predictive value of alkaloid character, species closely related botanically to others of known drug sources. In 1958 screening was extended to Papua New Guinea and some screening was also carried out in Central and Western Australia.

Over the years the results of many chemical studies undertaken during this Survey have been published in diverse scientific journals and books but no overall account of the Phytochemical Survey and the screening results has appeared. The publication of the main screening results on almost 2000 species in 'Plants for Medicines ...' is welcomed as it brings together for the first time a wealth of phytochemical information on the Australian flora and at a time that coincides with a resurgence of interest in this field.

'Plants for Medicines ...' consists of a Preface and Eight chapters. Chapter 1 briefly outlines the background to the phytochemical survey and CSIRO screening programme and summarizes the highlights of the studies. Structural diagrams are interspersed where appropriate through the text in Chapters 1 to 4. It is of interest that *Acacia* and *Eucalyptus*, the two largest genera in Australia, yielded very disappointing results; some simple alkaloids were found in species of *Acacia* but none has been isolated from a species of *Eucalyptus*.

The alkaloid and anti-tumour screening results are presented in Chapter 2. The screening for alkaloids was conducted by the CSIRO Division of Organic Chemistry (later Applied Organic Chemistry) as part of its collaborative programme with the American pharmaceutical company, Smith, Kline and French. The screening results presented in Table 2.1 occupy 48 pages. The identification of all species tested were verified at the time of collection or subsequently by staff of State or Commonwealth herbaria. Over a period of almost fifty years, as one would expect, the names of many of the plants changed

and there were significant changes in chemical methodology. It is to the credit of the authors that prior to the publication of this book every endeavour was made to provide contemporary nomenclature for all plants tested. In this regard, the assistance of State, Territory and Commonwealth herbaria was sought. The names by which the plants were known at the time the chemical examination was carried out are retained in parenthesis so that names can be correlated with records and published chemical studies. In the screening list and in other sections of the book the species are arranged alphabetically within genera, the genera alphabetically within families and the families are arranged alphabetically. The family circumscriptions for higher plants are those of Cronquist. Table 2.1 lists the name of the species, the locality from which the material was collected, the name of the collector and the collecting number, the parts of the plant analysed, the screening methods, whether there is a report on pharmacological testing of alkaloids in Chapter 3, whether the plant or total extract was screened for anti-tumour activity and whether further investigation of anti-tumour activity is provided in Chapter 4. The majority of species tested were vouchered and the vouchers were deposited in herbaria or in the CSIRO Division of Animal Health, Melbourne.

Chapter 3 deals with the Pharmacology of Alkaloids. The test procedures are outlined, and Table 3.1 lists the species investigated and the main activities observed. Detailed results for each species mentioned in the Table follow.

Chapter 4 covers the Anti-tumour Constituents. Table 4.1 lists the test tumours used in primary screening of pure chemicals and plant extracts, and Table 4.2 lists the anti-tumour species and their active fractions or constituents. Detailed results for each species follow Table 4.2. The results of tests on three groups of compounds are summarised in Tables 4.4, 4.5 and 4.6.

The volume is enhanced by the inclusion in Chapter 5 of sixty four colour plates, twelve of them reproductions of illustrations of species of phytochemical interest from Banks' 'Florilegium'. The remaining plates are of species examined during the course of the Phytochemical Survey. Thirty two of the photographs are by Keith Williams, three quarters of which have appeared in his Native Plants of Queensland volumes 1 (1979) and 2 (1984). By and large the photographs have reproduced well although some appear to have an excess of blue so that the colours are not quite true. The plate of *Borya septentrionalis* on p.178 is disappointing.

Chapter 6 consists of a bibliography of over 2000 papers published between 1940 and 1987 on the chemistry and related studies of Australian plant constituents. The bibliography of 70 pages relates mainly to plants indigenous to Australia (bacteria, fungi, algae, lichens and higher plants) but also includes papers on introduced species which are naturalised or used in pastures and New Guinea plants. A further 51 references appear in Chapter 7. Associated with the publication of 'Plants for Medicine ...' is the creation of a Phytochemical Data Base and enquiries may be directed to the first named author at the Department of Chemistry, Monash University.

One of the strengths of 'Plants for Medicines ...' is that it is extremely well indexed. Chapter 8 is devoted to Indexes to the text and bibliography. 8.1 is an index to plant genera and provides access at genus level to the text and screening list. 8.2 lists the genera within each family for which information may be found. 8.3 is an index to the authors of the publications listed in the bibliography and 8.4 is an alphabetical index to the chemical structures. The presence of these Indexes makes it easy to find the relevant information being sought.

The text is set in 10/11 Garamond and is very clear. Proof reading is of a high standard and I have detected very few inconsequential minor typographical errors, for example, Cuconiaceae instead of Cunoniaceae on p. 134 and the use of *Flagellaria* as a family name instead of Flagellariaceae on p. 135. My botanical background precludes any comments on the chemistry component of the book.

'Plants for Medicines ...' is an extremely useful addition to information

about the Australian flora and is a great credit to the many scientists who contributed to the Australian Phytochemical Survey. By detailing the species for which some phytochemical information is available, 'Plants for Medicines ...' draws attention to those species which have not been studied at all. As probably only about ten per cent of the Australian flora has been studied phytochemically, it is hoped that the publication of 'Plants for Medicine ...' will stimulate further studies on our flora while there is still the opportunity to do so before populations vanish. In addition, the advances in methodology may well make it worthwhile to re-investigate some of the species studied years ago. 'Plants for Medicine ...' will be invaluable for phytochemists and those in the fields of pharmacy, toxicology, agriculture, aboriginal studies and taxonomic botany and is highly recommended. It is very pleasing to see the fruits of such a significant CSIRO-based project in print and the authors and publisher are to be congratulated.

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